

The Multi-Trajectory Theory of Adult Firesetting (M-TTAF)

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ABSTRACT

The assessment and treatment of adults who set fires deliberately are underdeveloped relative to other areas of forensic-clinical psychology. From a scientist–practitioner perspective, all clinical assessment and treatment should be guided by a theoretical and empirically based understanding of the presenting clinical phenomena. In this paper, we critically review current typologies, motives, and theories regarding the etiological features of deliberate adult firesetting. Then, using a theory knitting perspective, we synthesize the prime parts of this information into a comprehensive multifactorial framework of deliberate firesetting. The resulting Multi-Trajectory Theory of Adult Firesetting (M-TTAF) is an integration of current theory, typological, and research knowledge into a comprehensive etiological theory of firesetting along with its maintenance, and desistence. In addition to this overall theoretical framework, we summarize five associated prototypical firesetting trajectories (or patterns of characteristics leading to the firesetting behavior) that stem from our theoretical work. We examine this new theory according to key evaluative components associated with theory construction and conclude by highlighting the M-TTAF's potential application in future research and practice innovation with adult firesetters.

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1. Introduction

Arson is a crime that results in both personal and economic devastation. Latest available US figures show that, in 2007, around 309,200 intentionally-set fires were recorded by fire departments causing 483 deaths, 7550 injuries, and leading to over 1 billion dollars of property-associated economic costs (Hall, 2010). Interestingly, however, there is a distinct lack of etiological theory or clinical treatment associated with the serious social issue that arson presents. Thus, there is a strong need for a comprehensive theoretical framework to guide professionals in their clinical work and subsequent treatment of firesetting. Existing research and reviews examining firesetting tend to focus almost exclusively on child and juvenile firesetters (e.g., Kolko, 1985; Lambie & Randell, 2011). However, only around half of all intentional firesetting that comes to professional attention is committed by juveniles (Cassel & Bernstein, 2007). Thus, adult firesetting is a prevalent and comparatively unexplained issue for consulting professionals (see Geller, 1992a, 1992b, 2007 for general reviews).

In this paper, we first examine the basic elements required for general theory development and appraisal. Then, we briefly introduce the key characteristics associated with deliberate firesetting and firesetting recidivism before critically examining the typologies, motives, and etiological theories associated with this behavior. This information is then synthesized into a comprehensive multifactorial framework of deliberate firesetting and we examine this new theory according to key evaluative components associated with theory construction. The resulting Multi-Trajectory Theory of Adult Firesetting (M-TTAF) is an integration of current theory, typological, and research knowledge into a comprehensive etiological theory of firesetting. In describing this theory, first we present the overall theoretical framework. Then, we summarize associated prototypical firesetting trajectories (or patterns of characteristics leading to firesetting behavior) that stem from our theoretical framework.

We intend this newly constructed theory to account for deliberate adult firesetting rather than deliberate firesetting confined to childhood or adolescence (e.g., Lambie & Randell, 2011). Our theory is also intended to account for both male and female adult firesetting, and firesetting that occurs in the context of mental health problems or psychiatric co-morbidity. Finally, we have chosen to construct a theory that accounts for 'firesetting' rather than 'arson.' This is because arson is a legal definition of intentional firesetting that varies across jurisdictions. Given that individuals who set intentional fires or hold a problematic relationship with fire are often not convicted for arson (Dickens, Sugarman, & Gannon, in press; Rice & Harris, 1996), we believe it essential that any new theory constructed should be able to explain the true variety of intentional firesetting seen by consulting clinicians in the course of their practice.

2. Theory development

In other areas of forensic-clinical psychology, such as general violence or sexual offending, theory construction and proliferation have become commonplace (see Anderson, Anderson, & Deuser, 1996; Anderson & Bushman, 2002; Anderson, Deuser, & DeNeve, 1995; Anderson & Dill, 2000; Finkelhor, 1984; Ward & Beech, 2006; Ward, Polaschek, & Beech, 2006; Ward & Siegert, 2002). Good etiological theory provides the foundation with which to chart the

interrelationships between an offender's presenting clinical problems and core psychological factors (i.e., case formulation; Gannon, Collie, Ward, & Thakker, 2008), thereby providing professionals with a unified description that may be used as a fundamental guide for assessment and treatment purposes. It should be noted that Ward and his colleagues (e.g., Ward et al., 2006; Ward & Hudson, 1998) transposed and synthesized much of the scientific theory, method, and appraisal work into the forensic realm when they examined the nature and focus of theory as applied to sexual offending. Thus, many of the arguments and commentary outlined below make reference to the scientific theory and appraisal work utilized by these researchers. Our definition of the term 'theory' throughout this paper is consistent with that of Kukla (2001) referred to by Ward et al. (2006) in which organized ideas or laws are used to explain and depict aspects of our world—i.e., psychological manifestations—that are not directly observable.

2.1. Theory foci and explanation

Within sexual offending, Ward and Hudson (1998) have meaningfully conceptualized theory as existing at one of three main foci or levels: *single factor*, *multi factor* or *micro theories*. Single factor theories are those that focus on the explanation of a lone factor and its causal relationship with offending (e.g., social learning theory). Multi factor theories, however, unite various single factor theories into a comprehensive overview of offending, providing an account of how the factors unite and interrelate to facilitate offending behavior. Finally, micro theories explain the cognitive, behavioral, and volitional factors associated with an offense process derived from both subjective data (i.e., offenders' statements) and objective data (e.g., police reports).

A relatively underdeveloped form of theory not specifically detailed by Ward and Hudson (1998) is *taxonomic classification*. Here, heterogeneous offenders are subtyped into groups based on shared motivating factors, personality characteristics, demographic details, or some combination of these. Such taxonomies represent unilateral classificatory systems that—if sufficiently explained and reliable—may play a valuable role in assessment and treatment strategies as well as guiding more detailed theory development.

One further area of theory-foci discussed by Ward and Hudson (1998) and Ward et al. (2006) relates to the conceptualization of proximal versus distal factors. *Distal* factors, as the label suggests, refers to factors or vulnerabilities that may be located as stemming from an individual's more distant developmental experiences (e.g., attachment to parents, child neglect or abuse) or even inherited genetics (e.g., personality predispositions). *Proximal* factors, on the other hand, refer to factors that trigger or act together with existing vulnerability factors to culminate in offending, e.g., *psychological states* (i.e., internal factors), and *events or situations* (i.e., external factors) (Ward et al., 2006). To illustrate, the strong negative affective state associated with being rejected by a partner is likely to interact with a person's pre-existing vulnerabilities (e.g., poor coping and an interest in fire) such that a person will choose to enact inappropriate and dangerous coping mechanisms (e.g., setting fire to a partner's apartment). Thus, any comprehensive explanation of criminal behavior must account for the presence of such vulnerability factors and explain how these

factors interact with more proximal variables to bring about the commission of an offense or particular behavior.

2.2. Components of a successful theory: Theory evaluation

The required features of a successful theory in forensic psychology (see Ward & Siegert, 2002) include:

1. Multiple factors to explain the problematic behavior (i.e., psychological, cultural, contextual, and biological variables) which should be further explicated as cognitive, affective and behavioral components within a clear and appropriate account of how such variables develop and interrelate (e.g., Social Learning Theory);
2. A clear account of the phenomena that the theory is attempting to describe (e.g., the specific psychological processes addressed and type of offending population);
3. A clear account of the mechanisms—and interaction of such mechanisms—hypothesized to create the psychological phenomenon associated with the presenting client;
4. A detailed description of the likely multiple trajectories that describe and account for the varying offender subtypes described and detailed in the research literature;
5. An integrated account of the distal and proximal factors—and interaction of these factors—associated with the generation of key psychological phenomenon. Furthermore, the theory should adequately detail why, in the context of developmental adversity, an individual might not come to offend; and,
6. A description of detail commensurate with contemporary research knowledge and literature on the topic.

In addition to these features, it can be useful for researchers and professionals involved in the process of theory development to think about the *relative* strength of their theory. Hooker (1987) and Newton-Smith (2002) have argued, for example, that the following criteria can be helpful for comparing relative utility of theories: *empirical adequacy* (i.e., is the theory supported by existing empirical research?), *external consistency* (i.e., is the theory consistent with background theories or other accepted prevailing theories?), *unifying power* (i.e., does the theory bring together previously isolated theories or research findings?), *fertility* (i.e., does the theory provide novel hypotheses, research arenas, or clinical interventions?), and *explanatory depth* (i.e., does the theory detail intricate mechanisms when describing the intended phenomena?). These criteria, among others, have been used successfully by researchers within sexual offending (e.g., Ward et al., 2006) to evaluate and describe current theoretical understandings of sexually inappropriate behavior as well as how such theories may be improved. Clearly, then, any newly developed theory should attempt to ensure adequacy in each of these domains so as to maximize theory utility.

There is one final component of theory development that remains critically important and, we would argue, is essential for constructing strong and unified theories of the phenomena in question. This component is ‘theory knitting’ and, as the name suggests, refers to the unification of the strongest or prime parts of previous theories, alongside additional components, to generate a new theory within a given domain (see Kalmar & Sternberg, 1988; Sternberg, Grigorenko, & Kalmar, 2001; Ward & Hudson, 1998). Thus, we will draw on the numerous theoretical approaches from varying research areas in order to develop a unified theory explaining firesetting behavior.

3. Existing theoretical explanations of firesetting

There are very few theoretical explanations of firesetting available for consulting professionals (see Dickens et al., in press; Gannon & Pina, 2010). In the sections that follow, we critically appraise currently proffered typological classifications and theories available to explain firesetting, paying particular attention to the theory appraisal criteria (i.e., Hooker, 1987; Newton-Smith, 2002) outlined earlier.

3.1. Typological classificatory systems

A plethora of typologies has been proposed to reduce the heterogeneity of firesetters into more manageable subcategories to aid clinical decision-making. Such divisions are generally made regarding perceived motivational factors, offense characteristics, or some combination of both (Bradford, 1982; Faulk, 1994; Icove & Estepp, 1987; Inciardi, 1970; Kidd, 1997; Lambie & Randell, 2011; Lewis & Yarnell, 1951; Prins, 1994; Prins, Tennent, & Trick, 1985; Rautaheimo, 1989; Rider, 1980; Rix, 1994; Scott, 1974; Vreeland & Levin, 1980). However, a smaller number of studies have derived typologies using empirically-driven strategies (Almond, Duggan, Shine, & Canter, 2005; Canter & Fritzon, 1998; Harris & Rice, 1996; see also Fritzon, Canter, & Wilton, 2001). Given typologies represent only the very earliest stages of theory development, we refrain from appraising each along the theory appraisal criteria outlined above (for more detailed reviews of typologies of firesetters see Doley, 2003; Gannon & Pina, 2010).

Lewis and Yarnell (1951) were some of the earliest researchers to provide any classificatory system for firesetters. In their work, which was based on 2000 reports of firesetting (obtained from the National Board of Underwriters, US), exclusive of those who set fires for profit, four categories of adult firesetter were identified who appeared to have set fires: *unintentionally* (e.g., through temporary confusion), through *delusions* (e.g., psychosis), through *erotic pleasure* (e.g., pyromania-traits or sexual pleasure), and to acquire *revenge* (e.g., jealousy). This early typology was groundbreaking since it laid the groundwork for other researchers to build upon and test this typology (i.e., fertility; see Bradford, 1982), and research evidence supports some of the key categories (e.g., revenge; Inciardi, 1970; Koson & Dvoskin, 1982; Pettitway, 1987; Rix, 1994). However, group membership criteria are poorly outlined and no reliability or general classification validation figures are provided by Lewis and Yarnell (1951).

Other typologies were developed decades later. Inciardi (1970) examined the case files of all firesetters released on parole from New York state prisons in a six year period (1961–1966) and observed six firesetter categories: *revenge*, (i.e., vengeance) *excitement* (i.e., pyromania type traits), *institutionalized* (i.e., firesetting in mental health facilities in order to be relocated), *insurance claim* (i.e., firesetting to obtain economic reward), *vandalism* (i.e., firesetting for fun), and *crime concealment* (i.e., firesetting to conceal another criminal act). Again, key strengths of this typology relate to the fact that (a) many of the categories have been empirically supported by other researchers (e.g., revenge, Koson & Dvoskin, 1982; Pettitway, 1987; Rix, 1994 and excitement, vandalism, and crime concealment; Icove & Estepp, 1987), and (b) because of the descriptive detail provided about firesetters representing each category, this classification offers fertility for possible clinical work. Nevertheless, although this typology was able to classify all 138 firesetters in the sample, very little detail is given about the method of group classification used and no inter-rater reliability statistics are detailed.

Numerous other typologies similar to Inciardi's (1970) have been proposed (see Dennet, 1980; Icove & Estepp, 1987; Rautaheimo, 1989). However, they all share similar weaknesses to the other aforementioned typologies. Even more simplistic are the dichotomous or tripartite typologies proposed by numerous professionals (e.g., Faulk, 1994; Kidd, 1997; Koson & Dvoskin, 1982; Levin, 1976; Moll, 1974; Muckley, 1997; Scott, 1974). Such typologies have not been particularly successful in terms of empirical adequacy or fertility since the categories are generally too broad (e.g., *motivated* versus *motiveless*; Scott, 1974).

The smaller number of typologies derived using data-driven strategies (Almond et al., 2005; Canter & Fritzon, 1998; Harris & Rice, 1996; Rice & Harris, 1991) provide a wider and more empirically robust classification of firesetters. For example, using cluster analysis Harris and Rice (1996) analyzed 11 variables hypothesized to be closely associated with firesetting in 243 mentally disordered US firesetters. The

resulting four categories were labeled: *Psychotics* ($n = 79$; firesetters who were motivated primarily by delusions and characterized by few firesetting incidents and absence of fire accelerant usage), *Unassertives* ($n = 67$; firesetters who were motivated primarily by anger or vengeance and characterized by low levels of assertiveness in the context of relatively positive developmental and adulthood histories), *Multi-Firesetters* ($n = 57$; firesetters who had primarily set fire in institutions and were characterized by extremely poor developmental experiences and lengthy psychiatric hospital stays), and *Criminals* ($n = 40$; firesetters who appeared most likely to fireset at night characterized by high levels of assertion, poor developmental experiences, and personality disorder). Harris and Rice (1996) examined the recidivism of the majority of the sample ($n = 208$) and found that the multi-firesetters and criminals were most likely out of the groups to reoffend (i.e., using fire, violence or any other crime type). This typology is arguably one of the strongest available since it is empirically adequate, details the criteria required for group membership, and classified all firesetters within the sample. Nevertheless, this typology remains to be further validated on wider samples and refers only to firesetters who are mentally disordered. Thus, any newly developed comprehensive theory of firesetting must adequately account for the varying offender subtypes outlined in the proliferation of typologies detailed in the research literature.

3.2. Single factor theories

Very few single-factor theories exist in relation to firesetting (e.g., psychoanalytical theory, social learning theory, neurobiological theory), which may, in part, explain the lack of wider theory development in this area. Below, we outline what we believe represents the most contemporary and empirically adequate single factor theory available in relation to firesetting before exploring the multi-factor theories that have utilized and incorporated this theory.

3.2.1. Social learning theory

Social learning theorists view firesetting as the product of various learning principles (i.e., reinforcement contingencies, modeling, imitation; Bandura, 1976; Kolko & Kazdin, 1986; Macht & Mack, 1968; Singer & Hensley, 2004; Vreeland & Levin, 1980). Vreeland and Levin (1980), for example, propose that firesetting can be instantly reinforcing via (1) the sensory excitement, and (2) the sirens, crowd, and noise associated with the fire. In addition, since positive reinforcement does not need to be directly experienced for social learning to occur, learning associated with fire may occur vicariously through mere exposure to fires or key models of firesetting behavior (e.g., parents and caregivers). There is indeed some evidence suggesting that firesetters are more likely to have experienced early exposure to fire (see Macht & Mack, 1968; Wolford, 1972), to have experienced fire as a form of punishment (Haines, Lambie, & Seymour, 2006; Ritvo, Shanok, & Lewis, 1983), or to have a family history of firesetting (Rice & Harris, 1991).

A number of key motivations linked with firesetting may be adequately explained via social learning theory. For example, firesetting motivated by fire interest may stem from early positive exposure to fire (e.g., a firefighter father; Gannon & Pina, 2010). Furthermore, revenge, or firesetting related to anger (i.e., displaced aggression; McKerracher & Dacre, 1966) may also be adequately explained by social learning theory. Social learning theory predicts that environmental reinforcement contingencies shape an individual's self regulatory responses (Baumeister & Vohs, 2004). Consequently, poor childhood socialization (i.e., poor role models and developmental adversity) may result in experiences of perceived failure, aggression, poor coping, and low assertiveness which may increase an individual's propensity to light fires in an attempt to gain some level of environmental control (Vreeland & Levin, 1980). Thus, social learning theory (see Kolko & Kazdin, 1986; Vreeland & Levin, 1980) predicts that various developmental

experiences, cues, cognitive perceptions and expectations shape an individual's propensity toward firesetting; in particular as a form of learnt hostility/aggression. Thus, this single factor theory should, in our opinion, play a key role in any newly developed comprehensive theory of firesetting.

3.3. Multi factor theories

There is a surprising dearth of multifactor theories available for consulting professionals who assess and treat firesetters in practice. Of the two theories available, both were developed over a decade ago. Nevertheless, both theories exhibit desirable features that, in our opinion, should play a critical role in any newly developed comprehensive theory of firesetting.

3.3.1. Functional Analysis Theory: Firesetting as the only viable option (Jackson, 1994; Jackson, Glass, & Hope, 1987)

The earliest multifactor explanation of firesetting proposed by Jackson and colleagues employs Functional Analysis Theory principles (see Sturme, 2008) to explain firesetting as the product of a complex interaction of antecedents (i.e., prior events and circumstances) and behavioral consequences (i.e., reinforcement principles associated with either accidental or deliberate firesetting). Jackson et al. (1987) use their clinical experience, the research literature on firesetters, and social learning theory to formulate the links hypothesized to produce and reinforce firesetting behavior. In relation to *antecedents*, Jackson and colleagues argue that five main factors underlie intentional firesetting: (1) psychosocial disadvantage (e.g., poor caregiver relationships and linked psychological consequences); (2) life dissatisfaction and associated self loathing (e.g., depression and self esteem problems relating to psychosocial disadvantage); (3) social ineffectiveness (e.g., experiences of rejection and diminished conflict resolution skills); (4) factors determining individual experience of fire (e.g., preexisting vicarious or individual experiences with fire); and, (5) internal or external firesetting triggers (e.g., affective states or external contexts that trigger urges of firesetting).

Jackson and colleagues hypothesize that reinforcement contingencies play a key role in both facilitating and maintaining firesetting. For example, the authors contend that, for some children who experience social problems, fire and associated paraphernalia are likely to offer them (1) power and acceptance from peers unavailable to them via their usual restricted social repertoire, or (2) an increase in attention from distanced caregivers such that fire usage becomes positively reinforced. Jackson and colleagues also hypothesize that such temporary increases in personal effectiveness and self esteem along with the potential sensory reinforcement provided by fire may well escalate the individual's interest in fire and this increases the chances of future firesetting actions. In terms of negative reinforcement principles, the authors hypothesize that these may play an equally important role in developing and maintaining firesetting. They refer to the frequently punitive consequences of firesetting (e.g., rejection, punishment, intense and increased supervision) as potentially intensifying and strengthening the personal inadequacies already experienced by an individual such that antisocial firesetting may be further maintained. In summary, Jackson (1994) maintains that firesetting—viewed via a functional analysis perspective—is used to resolve problems or difficult circumstances that are perceived by the individual to be impossible to solve via alternative methods.

Jackson and colleagues' Functional Analysis Theory of firesetting is arguably the most widely utilized theory by clinical professionals. A key reason for this is that the theory provides a clear and yet complex multifactor framework of many of the key factors associated with firesetting as well as their interrelationships. Thus, the theory is intuitively appealing and, more so than many other explanations of firesetting, is able to provide a good level of direction for clinical interventions in the form of clinical *fertility* (e.g., interventions may

be directed at improving social skills and personal effectiveness; see Swaffer, Haggett, & Oxley, 2001). Furthermore, many of the core assumptions underlying the theory are supported empirically (e.g., fire-setters' impoverished social skills; Rice & Chaplin, 1979) suggesting a good level of empirical adequacy. Relatedly, the fundamental reinforcement contingencies are founded on the established principles of conditioning theory (i.e., strong *external consistency*) and Jackson and colleagues' theory unifies previously isolated theories and research into a unified whole (e.g., unification of social learning theory and conditioning theory) illustrating a good level of *unifying power*.

The Functional Analysis Theory is, however, subject to numerous problems. Specifically, the theory neglects to explain why individuals who *do not* experience psychosocial disadvantage stemming from childhood engage in firesetting behavior (see Fineman, 1995) nor why some individuals who experience psychosocial disadvantage do not engage in firesetting. Furthermore, firesetting that occurs in the context of general offending is not examined and some researchers appear to assume that all repetitive firesetting is accompanied by at least some level of fire interest (Jackson et al., 1987). In addition, although the theory pays specific attention to the developmental components hypothesized to be related to firesetting, only one specific aspect of developmental experience is focused upon (i.e., adverse experiences) and the proximal elements of the theory are relatively less clearly explicated. For example, there is no focus on the cognitions likely to prompt or reinforce firesettings and little examination of proximal affective factors or of the factors that might promote desistance in firesetting. Finally, many different motivations to fireset are seen in treatment and these individual motivations and their proposed inter-relations with other component parts are not specifically or sufficiently explicated in the theory. In summary then, only a subset of (1) the possible mechanisms or experiences associated with firesetting, and (2) the types of firesetters seen in practice are explained via this theory limiting its ability to aid assessment and treatment for the range of firesetters typically seen in practice.

3.3.2. Dynamic Behavior Theory (Fineman, 1980, 1995)

The other multifactor theory currently available to explain firesetting is Fineman's Dynamic Behavior Theory. There are many similarities between this theory and Jackson et al.'s Functional Analysis Theory, although these are not explicitly referred to by Fineman (1995). Akin with Jackson's Functional Analysis Theory, Fineman (1995) hypothesized that firesetting resulted from core historical psychosocial influences that direct and shape firesetting propensity via formative social learning experiences. Utilizing a dynamic-behavioral framework (i.e., Cook, Hersch, Gaynor, & Roehl, 1989; Gaynor, 1991), Fineman (1995) described firesetting via the following formula:

$$\text{Firesetting} = G1 + G2 + E$$

where $[E = C + CF + D1 + D2 + D3 + F1 + F2 + F3 + \text{Rex} + \text{Rin}]$.

In short, this equation specifies firesetting to be the result of: (G1) historical factors that predispose antisocial actions (e.g., social disadvantage and social ineffectiveness), (G2) previous and existing environmental reinforcers associated with firesetting (e.g., childhood fire experiences and fire fascination), and (E) instant environmental reinforcers associated with firesetting (e.g., external, internal, and sensory reinforcement). Fineman (1995) further unpacks (E)—(instant environmental reinforcers)—into numerous variables that he argues should be explored by consulting clinicians. There are (C) impulsivity triggers (e.g., rejection or trauma), (CF) crime scene features that may provide guidance regarding the goals of firesetting (e.g., Was a specific individual targeted?), (D1, D2, and D3) cognitions prior to, at the time of, and post firesetting, and (F1, F2, and F3) affect prior to, at the time of, and post firesetting. Finally,

(R) is used as a descriptor for any firesetting reinforcers including (Rex)—external reinforcers such as financial reward—and (Rin)—internal reinforcers such as satisfaction or sensory stimulation. Within this theory, firesetting is hypothesized to stem from the culmination of interactions between all of the above aforementioned factors and Fineman recommends careful exploration of each in the assessment and treatment of firesetters.

Fineman's (1980, 1995) Dynamic Behavior Theory has played a critical role in developing professionals' understanding of firesetting behavior. Fineman's elaboration of the more proximal variables associated with firesetting (e.g., cognition, affective states) is a particular strength since it articulates in some detail how key psychological factors contribute to the development and maintenance of firesetting behavior (i.e., some explanatory depth). A further strength of this theory is that it is clinically fertile since the underpinning conditioning principles are well supported in contemporary clinical psychology (i.e., good external consistency that is intuitively appealing to clinicians) and unifies this with contemporary knowledge about firesetting (i.e., unifying power) providing a logical framework with which to guide the assessment and formulation of firesetting behavior. In particular, for example, Fineman (1995) developed an assessment grid to aid understanding of the sequence of factors leading to and reinforcing firesetting (i.e., the Firesetting Sequence Analysis form). Such a sequence of factors represents an invaluable tool for understanding firesetting as a sequential process, as well as for working with firesetters to understand the factors associated with their offending and possible reoffending.

In addition to these strengths, however, the Dynamic Behavior Theory is subject to some problems that limit its usefulness as a clinical resource. In particular, the theory is more heavily weighted toward explaining juvenile rather than adult firesetting (i.e., most empirical support for the theory relates to juvenile firesetters) resulting in a theory that is unable to explore the plethora of mechanisms associated with adult firesetting (i.e., a lack of explanatory depth). Furthermore, while the Dynamic Behavior Theory is better able to explain firesetting in the context of other antisocial behavior (i.e., in the absence of intense fascination or interest in fire), the focus again leans toward juvenile (curiosity) firesetters to the neglect of their adult counterparts.

Both the Functional Analysis and Behavioral Dynamic theories hold strengths in their ability to explain firesetting. Perhaps the most obvious of these relates to the incorporation of social learning theory in order to explain recidivist firesetting (Functional Analysis Theory), and the comprehensive focus on key variables such as cognition and affect that are likely to affect firesetting tendencies at the proximal stage of the offense chain (Behavior Dynamic Theory). What is missing from these existing accounts, however, is any reference to the full range of possible dynamic risk factors or criminogenic needs associated with a broad range of firesetting behaviors (as well as a description of how such factors might interact to produce firesetting), an incorporation or acknowledgment of firesetter subtypes/typologies or of the potential factors that may be associated with firesetting desistance.

Clearly, then, adhering to the theory knitting perspective outlined previously (Kalmar & Sternberg, 1988), any further theory proffered must convincingly integrate the strengths inherent in previous typological approaches to firesetting with the strengths so obviously apparent in existing multi factor theories of firesetting. The aim, then, is to unify these strengths alongside new ideas to produce a powerful and inclusive theory to adequately explain adult firesetting. Nevertheless, while our aim is to generate a new and comprehensive theory in the area of firesetting, we do acknowledge that our generation of theory is based upon what is generally a scant and underdeveloped research base. In particular, we feel that the disparate research literature between male and female firesetters has greatly reduced our ability to make direct gender-associated hypotheses and observations within the theory.

4. The Multi-Trajectory Theory of Adult Firesetting (M-TTAF)

Before describing the M-TTAF in full, it is important to outline (a) the key phenomenon that the theory will address, and (b) the exact form and structure that the theory will take.

4.1. Key phenomenon addressed by the M-TTAF

The adult firesetting research literature is generally underdeveloped, relative to other forensic fields, in pinpointing the exact criminogenic needs that should be targeted to reduce firesetting recidivism (Gannon, 2010; Gannon & Pina, 2010). However, an examination of available research literature, current theoretical explanations, and our clinical experience with adult firesetters suggests four key psychological issues likely to be associated with firesetting: (1) *Inappropriate fire interest/scripts*, (2) *Offense-supportive cognition*, (3) *Self/emotional regulation issues*, and (4) *Communication problems*. Each psychological issue outlined represents an overarching umbrella for describing a number of key clinical issues that may fall within that domain and may manifest variously in combination with other factors. For example offense-supportive cognition may revolve around attitudes that support criminal behavior generally or more specific attitudes that support the use of fire. Importantly then, firesetter variability/acuteness on each of these four key psychological issues and the interactions between them are key to explaining the inherent and often confusing variability of firesetter and firesetting characteristics often seen in clinical practice. In short, we believe that a helpful way of viewing each of the four issues is as a continuum of sorts, whereby firesetters fall somewhere along each continuum for each psychological issue regarding deficiency or surplus of functioning. Examining firesetting in this way ensures that we are able to explain firesetters who may appear relatively high functioning and intact in some areas (e.g., emotional regulation skills) but who, in fact, use these skills in the context of antisocial attitudes and values (offense-supportive attitudes) to facilitate firesetting behavior.

4.2. M-TTAF structure

The M-TTAF has been developed to represent a multi-factorial theory of firesetting. In this sense, then, we will first present the overall theoretical framework of the theory (i.e., Tier 1; see Fig. 1). At this tier, the M-TTAF will integrate current theory and research knowledge into a broad etiological theory of firesetting regarding the factors and mechanisms that interact to facilitate and reinforce firesetting. It is at this general multi-factor level that existing researchers have attempted to describe firesetting (Fineman, 1980, 1995; Jackson et al., 1987). In addition to this, however, we also incorporate typological knowledge of firesetting at Tier 2 of the theory (see Table 1). Here, we summarize what we view as being prototypical trajectories (or patterns of characteristics leading to firesetting behavior) that stem from our theoretical framework. Our aim, by including this second tier, is to ensure that clinicians may consult a helpful prototype of the differing ways in which firesetters may arrive at firesetting. This aspect of viewing clinical issues associated with offending behavior was successfully developed and adopted by Ward and Siegert (2002) in order to explain sexual offending. Thus, we integrate a previously successful theoretical component into the M-TTAF in order to broaden its function and utility. It should be noted that this is not the first synthesis of Ward and Siegert's (2002) model of sexual offending into the field of firesetting. Fritzson (in press) was, in fact, the first researcher to note similarities between Ward and Siegert's model of sexual offending and aspects of offending committed by arsonists.

4.3. Tier 1: A description of the M-TTAF's broad etiological framework

It is generally accepted that descriptions of offending behavior must incorporate multiple factors if they are to play any guiding or

effective role in the therapeutic process (Ward et al., 2006). The M-TTAF (see Fig. 1) seeks to explain firesetting via myriad factors at varying levels. The main component factors explicated within the M-TTAF include: *developmental factors* (i.e., caregiver environment, abusive experiences), *biological factors/temperament* (e.g., brain structure), *cultural factors* (e.g., societal beliefs and attitudes toward fire), *social learning factors* (e.g., fire experiences, coping scripts), and *contextual factors* (e.g., life events and other contextual triggers). *Psychological vulnerabilities* (e.g., inappropriate fire interest, offense-supportive attitudes, self/emotional regulation issues, and communicative problems) are also key variables that later form the presenting clinical features seen in therapy. These psychological vulnerabilities represent core psychological processes that are reflected by, and interact with, key biological, cultural, social learning, and contextual factors either distally or proximally in relation to firesetting.

4.3.1. Developmental context

Before describing the form and function of psychological vulnerabilities associated with firesetting, we describe the distal developmental context and key factors hypothesized to play a role in this context. A key aspect relates to *caregiver environment*. Poor caregiver environment in the form of insecure attachments (Bowlby, 1969, 1973, 1980), abusive or neglectful parenting, and social disadvantage have been found to interfere with the development of healthy self-esteem, self-regulatory processes, and general social adjustment (Scarr & Eisenberg, 1993; Shaw, Krause, Chatters, Connell, & Ingersoll-Dayton, 2004). Naturally, the presence of protective factors will play a role in how individuals respond to such adverse caregiving situations (Luthar & Zigler, 1991; Masten, Best, & Garmezy, 1990). The caregiver context provides individuals with their earliest *learning experiences* via social learning in which children learn a variety of social scripts, attitudes and values, communication skills, scripts for coping, the form and functions of fire, and ultimately their sense of identity and self worth (Bandura, 1977; Erikson, 1968). For example, an individual may witness or be encouraged to retaliate to provocation via indirect aggression. *Cultural forces* will also play a key role in the function and form that this early learning takes. For example, Western cultural attitudes that revere fire may well feed into a preference to use fire as the retaliatory tool as will early experiences with fire. *Biology and temperament* will also play an important role since impoverished brain structure and neurobiology (see Virkkunen, DeJong, Bartko, Goodwin, & Linnoila, 1989; Virkkunen, Nuutila, Goodwin, & Linnoila, 1987) for example, is likely to play a key role in shaping learning and self regulatory responses. Thus, an individual with limited brain functioning whose social skills are lacking—relative to siblings—may learn to adopt fire to communicate needs to others. In summary, the developmental context described attends to the distal features and mechanisms hypothesized to create and interact with psychological vulnerabilities (described below) as well as key proximal biological, cultural, social, and contextual factors/triggers.

4.3.2. Psychological vulnerabilities

4.3.2.1. Inappropriate fire interest/scripts. Research suggests that one important risk factor for firesetting relates to an interest in or fascination with fire (Dickens et al., 2009; Gannon & Barrowcliffe, 2011). It is important here to differentiate fire interest from the diagnosis of *Pyromania* which is rarely utilized by consulting professionals due to a narrow scope of diagnosis criteria (i.e., no other motivators, diagnoses, or judgment impairment may be present; see *American Psychiatric Association [DSM-IV-TR]*, 2000). Thus individuals diagnosed with *Pyromania* will hold inappropriate fire interest, but not all individuals who experience inappropriate fire interest will necessarily fit the criteria for *Pyromania* diagnosis. Previous researchers have hypothesized that fire holds instantly reinforcing consequences in the form of sensory stimulation (e.g., flames, arousal, sirens, and sound) as

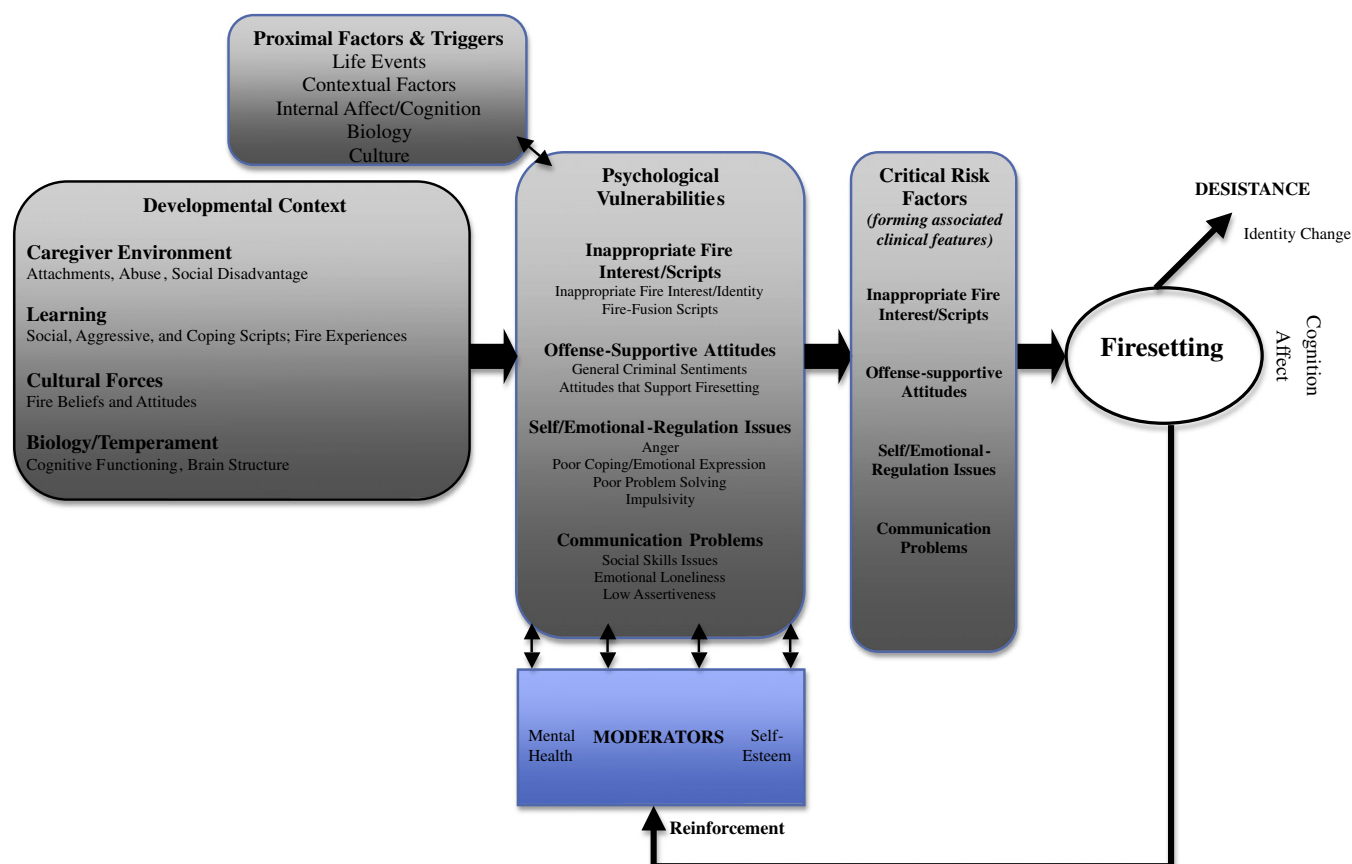


Fig. 1. A summary of the M-TTAF: Tier 1

well as positive reinforcement in the form of self efficacy, power, economic gain, and attention (Fineman, 1980, 1995; Jackson et al., 1987; Vreeland & Levin, 1980). Furthermore, the often negative

consequences of firesetting (e.g., punitive responses and restricted opportunities with fire) may exacerbate individuals' existing tendencies to seek out opportunities to elicit the 'forbidden' positive

Table 1

A summary of the key trajectories comprising the M-TTAF: Tier 2.

Trajectory	Prominent risk factor	Other Likely risk factors	Potential clinical features	Potential motivators
Antisocial	Offense-supportive attitudes/values (supporting general criminality)	Self-regulation issues (e.g., poor emotional modulation)	Antisocial values/attitudes Impulsivity Conduct disorder or antisocial personality disorder	Vandalism/boredom Crime concealment profit Revenge/retribution
Grievance	Self-regulation issues	Communication problems Inappropriate fire script	Low assertiveness Poor communication Fire-aggression fusion script Anger (rumination) Hostility	Revenge/retribution
Fire interest	Inappropriate fire interest/scripts	Offense-supportive attitudes (supporting firesetting)	Fire fascination/interest Impulsivity Attitudes supporting fire	Fire interest/thrill Stress/boredom
Emotionally expressive/need for recognition	Communication problems	Self-regulation issues* (e.g., poor emotional modulation)	Poor communication Impulsivity Depression Fire-coping fusion script Personality traits/disorder	Cry for help* Self-harm* Suicide* Need for recognition
Multi-faceted	Offense-supportive attitudes/values (supporting general criminality and firesetting) Inappropriate fire interest/scripts	Self-regulation Issues Communication problems	Pervasive firesetting/general criminal behavior Fire fascination/interest Antisocial values/attitudes Conduct disorder or antisocial personality disorder	Various

* = Emotionally expressive subtype only.

consequences of fire; thus further increasing fire interest (see Jackson et al., 1987). We view fire interest as representing a natural curiosity for a dangerous and yet necessary natural energy that has played a role in the survival of our ancestors (e.g., light, warmth, food preparation; Fessler, 2006; Stanford, 2001). Across some non-Western cultures, fire is viewed instrumentally and children's access to fire and its manipulation is relaxed, if not mundane (Fessler, 2006). Within Western cultures, on the other hand, fire is reserved for special events or entertainment resulting in little opportunity for children or young adults to manipulate and learn about fire (Fessler, 2006). Consequently, we hypothesize that fire learning within Western cultures (see Fessler, 2006) is impoverished and highly formal eliciting an inappropriately salient focus on fire that may become internalized within particular individuals via individual differences in childhood learning and fire-associated experiences. For example, an individual experiencing a neglectful developmental context may—via social learning and conditioning principles—experience their first formative and positive interpersonal experiences (e.g., with peers) from manipulating and controlling fire (see Jackson et al., 1987). Consequently, when experiencing periods of loneliness or rejection, fire may become a powerful force used in an attempt to recreate positive internal efficacy and power and, with repeated use, may well form a significant part of an individual's developing self identity (e.g., “fire defines who I am”).

4.4.1.1. Fire scripts. Learning about fire represents a significant and important precursor to how fire is viewed and utilized. Just as distorted scripts regarding sex and aggression can be learnt (e.g., Huesmann, 1988; Huesmann & Eron, 1984; Ward & Siegert, 2002), so too can an individual's views about the potential uses and meanings of fire (what we will refer to here as a *fire-script*). Within the M-TTAF we define a script according to the definition provided by Tomkins (1991) as a set of cognitive rules “for the interpretation, evaluation, prediction, production, or control” of circumstances (p. 84). Several probable scripts are likely to be important in firesetting behavior. One is a form of aggressive script in which indirect aggression or emotionally detached aggression is highly valued as a means for delivering revenge or warnings to others. In this context, fire becomes inextricably linked within the script as a preferred messenger since it allows the individual to send an authoritative, yet emotionally detached, message via a powerful natural force (what we refer to as an *aggression-fire fusion script*). More general aggressive scripts (direct and indirect) are also likely to play some role in the context of generally antisocial firesetting. In these general aggressive scripts, however, fire happens to represent an opportunistic tool and does not form an intrinsic part of that script.

Other types of fire-script may contain information about the potential uses and meanings of fire in the absence of any aggressive components. For example, individuals may hold pervasive *fire coping scripts* in which fire is viewed as a powerful envoy to be utilized to cope with various problematic situations since it grabs attention, destroys property irretrievably, and can promote environmental change readily. Presumably, such scripts may be learnt via social learning suggesting that our formative experiences of others' uses and meanings of fire (see Gannon & Pina, 2010 for a review) will impact directly on the formation of fire scripts.

4.3.2.2. Offense-supportive attitudes. Offense-supportive cognition refers to the numerous cognitive components that may be associated with firesetting including offense-supportive attitudes/beliefs, and empathy and theory of mind components. Offense-supportive attitudes and beliefs are the cognitive accounts that individuals build from their experiences with their social world in order to facilitate a swift and adaptive interpretation of social interactions (Gannon, Ward, Beech, & Fisher, 2007). Attitudes or beliefs held by individuals are hypothesized to vary as a function of each individual's unique formative experiences (Hollon & Kriss, 1984). In other areas of forensic psychology (e.g., sexual

offending; Polaschek & Gannon, 2004; Ward, 2000; Ward & Keenan, 1999) it is widely accepted that some offenders hold offense-supportive schemas or “theories” that guide their processing of social information in an offense-supportive manner. Thus, offense-supportive information is attended to disproportionately and ambiguous information is disambiguated in an offense-supportive manner resulting in a cognitive system that is not only self-fulfilling but highly resistant to change (Hollon & Kriss, 1984).

Curiously, little attention has been paid to the cognitive systems of firesetters; presumably because their beliefs are hypothesized to overlap with that of other offenders (e.g., violent offenders; Polaschek, Calvert, & Gannon, 2009). However, we hypothesize that firesetters may hold various combinations of schemas that support firesetting both directly and indirectly in the form of: believing fire may be controlled and harmless, and viewing oneself as entitled, in some circumstances, to set fires. Many of these offense-supportive cognitions may also be indicative of empathy or theory of mind deficits. In short, empathy is hypothesized to be composed of both a *cognitive* element (i.e., being able to see the world from another person's viewpoint) and *affective* elements (i.e., being able to construct and perform an appropriate emotional response; Baron-Cohen & Wheelwright, 2004). Cognitively placing oneself into another's shoes is termed ‘theory of mind’ (Baron-Cohen & Wheelwright, 2004) and it is this element of empathy that may be lacking in the presence of offense-supportive attitudes and beliefs.

Offense-supportive cognition has been detailed in other explanations of firesetting (e.g., Fineman, 1980, 1995) and we hypothesize that the exact form and origins of the offense-supportive cognition will play a critical role in explaining the etiological trajectory of firesetting and its maintenance, as well as guiding principles and methods of treatment. For example, a firesetter who appears to believe that fire is not harmful is likely to stand in stark contrast to an individual who is generally antisocial and holds wider attitudes supporting criminal activity and behavior. While both may well hold some possible theory of mind and/or empathy deficits that require exploration, the underlying goals and motivators associated with their firesetting may be fundamentally different. Thus, for firesetters who hold fire supportive attitudes, key issues for therapy are likely to revolve around addressing fire interest and improving fire safety awareness. For those holding more generally antisocial attitudes, however, antisocial goals and motivations may appear to represent the most pertinent focus for treatment.

4.3.2.3. Self/emotional regulation issues. Self/emotional regulation refers to an individual's ability to effectively monitor internal affective states and facets of the external world in order to achieve personal goals across varying situations and time-points (Baumeister & Heatherton, 1996; Baumeister & Vohs, 2004; Karoly, 1993). In brief, self-regulation refers to the goal-setting, self monitoring, and evaluation processes associated with self control. As such, there are numerous deficits within this system that may be associated with problematic behavior (Boekaerts, Pintrich, & Zeider, 2000). Individuals may hold deficiencies in their overall control or ability to suppress emotions and/or behaviors (e.g., uncontrolled anger). Alternatively, individuals may hold exceptionally impressive control over their emotions and behaviors in the pursuit of a desired, yet inappropriate, purpose/goal (e.g., to solve a problem without engaging in direct communication), or may simply choose inappropriate methods for adjusting or coping with stressful circumstances and attendant emotions (e.g., substance use, avoidant coping).

Research with firesetters highlights self-regulation problems in the form of impulsivity (Räsänen, Puumalainen, Janhonen, & Väisänen, 1996), low frustration tolerance (Jackson, 1994; Tennent, McQuaid, Loughnane, & Hands, 1971), anger (Rix, 1994), inappropriate goals (e.g., arson for profit; Sapp, Gary, Huff, & James, 1994), and poor coping (Dickens et al., in press). Clearly then, self-regulation issues may take many forms that are likely to play a critical role in explaining the

etiological trajectory of firesetting as well as guiding principles and methods of treatment. Thus, an offender who meticulously plans their firesetting in order to meet antisocial goals (e.g., revenge or crime concealment) is likely to hold good self-regulation and planning and require intense work exploring anti-social cognitions and goals. An offender who sets fire to their house more impulsively following an argument with a partner may well require work examining emotional regulation, coping strategies, and self control, however. Again, research suggests that self-regulatory processes are learnt from formative caregivers who model and promote appropriate self-regulation (Baumeister & Vohs, 2004). Thus, over-controlling, or neglectful parenting is hypothesized to be associated with underdeveloped and inadequate self regulatory behaviors (Baumeister & Vohs, 2004). Positive experiences with caregivers (e.g., sensitive and responsive caregiving), on the other hand, may result in skillful and intact self-regulatory behaviors (Baumeister & Vohs, 2004).

4.3.2.4. Communication problems. Communication refers to an individual's ability to effectively communicate ideas, needs, and goals to other individuals. Communication is composed of basic social skills (including emotional decoding), the ability (and value) placed upon the formation and maintenance of social and intimate relationships, as well as basic assertiveness skills. Research with firesetters highlights cases of impoverished communication in the form of social skills, poor assertiveness, and passivity (Noblett & Nelson, 2001; Rice & Chaplin, 1979; Rice & Harris, 2008; Stewart, 1993). Such problems with adult communications and attachment styles are likely to be experienced by individuals as a result of pathogenic caregiving experiences (Focus Adolescent Services, n.d.; Räsänen et al., 1996) which are hypothesized to interfere with the development of healthy self esteem and general social adjustment (Scarr & Eisenberg, 1993; Shaw et al., 2004). Furthermore, experiencing poor relationships with early caregivers (see Bowlby, 1969, 1973, 1980) is hypothesized to mold internal expectations regarding future relationships and styles of later adult interactions that can interfere with the development and maintenance of intimate relationships (Bartholomew & Horowitz, 1991; Hazan & Shaver, 1987).

Evidence does suggest that some firesetters are lonely individuals characterized by impoverished networks of social support (Barracato, 1979; Bennett & Hess, 1984; Inciardi, 1970; Leong, 1992; Rice & Harris, 1991; Ritchie & Huff, 1999). Thus, in the absence of appropriate social and communication skills, individuals may feel isolated, and disconnected from the society in which they live, and unable to fulfill their needs in socially appropriate ways. In this context, then, poor communication skills may directly or indirectly culminate in firesetting since such behavior may be used in order to obtain status and power (e.g., an attempt to appear heroic and gain external recognition; a direct attempt to obtain social respect via firesetting) or indirectly express general frustration at being unable to secure valued life experiences (e.g., cry for help type motivations). Communication problems may also represent key etiological factors in self-harming and suicidal behavior. Here, fire may be used to release intense negative affect that the individual feels unable to communicate or release via other means.

4.3.2.5. Proximal factors/triggers, moderators, and critical risk factors. A crucial aspect for any theory relating to offending behavior is how the psychological vulnerabilities outlined previously translate into key factors that interact to facilitate firesetting and which later form the presenting clinical features seen in therapy. Of key importance here is the continuing and dynamic interactive influence of proximal biological, cultural, individual, and contextual variables. As outlined in Fig. 1, we view key proximal factors and triggers (both external and internal) in the form of life events, contextual factors, and internal affect/cognition to represent key variables that may be reflected by, and will interact with key psychological vulnerabilities to produce

what we term 'critical risk factors' that function to facilitate firesetting behavior.

Critical risk factors represent what we believe are existing psychological vulnerabilities that become primed or heavily exacerbated prior to firesetting and which often present as clinical issues post offense. To illustrate, an individual who holds pre-existing vulnerabilities in the areas of inappropriate fire scripts and emotional regulation issues (i.e., anger and poor coping skills) may experience significant and distressing life events (e.g., increasing debt and threat of eviction) due to their dysfunctional coping approach. This increases strong internal negative affect (e.g., anger, hopelessness), triggering the individual's current vulnerabilities into critical risk factors (i.e., communication problems and self-regulation issues) in which fire is cognitively viewed to be the only 'viable' response (Jackson, 1994) for coping with the impending situation (e.g., "I'll burn the house down so that no one can have it and I will be arrested"). The clinical issues seen post-offense are likely to be anger, poor coping, impoverished problem solving, and inappropriate fire-coping scripts.

Of critical importance between the interaction of psychological vulnerabilities and triggers, is the role of what we hypothesize to be moderating factors in this relationship: *mental health* and *self-esteem*. Although mental health deficits are often identified as key motivators in firesetting (e.g., Lewis & Yarnell, 1951; Prins, 1994), there is marked confusion in the general literature regarding the exact link between mental illness and crime generally (see Sirotych, 2008). Nevertheless, research suggests that mental health deficits alone do not uniquely predict the commission of crime generally (Elbogen & Johnson, 2009). Consequently, we conceptualize mental health as a key moderator that dictates how severely a proximal trigger will reflect, and interact with psychological vulnerabilities to produce critical risk factors that facilitate firesetting. For example, an individual with poor mental health in the form of depression and the psychological vulnerability of poor emotional self-regulation (e.g., poor coping and impulsivity) is likely to be more severely affected by triggers since their mental health problems will greatly limit an already compromised coping response. It is important to highlight, however, that in viewing mental health primarily as a moderator, this does not preclude mental health as representing a more critical risk factor in some complex cases (e.g., command hallucinations). However, the exact function of the mental health issue should be formulated carefully since in some cases, command hallucinations may disinhibit or exacerbate pre-existing vulnerabilities (e.g., a pre-existing fire interest or aggressive temperament).

Several studies suggest that self-esteem plays a crucial role in the etiology of crime (Hubbard, 2006; Oser, 2006). Furthermore, firesetters, in some cases, are characterized by low self esteem (Smith & Short, 1995; Swaffer & Hollin, 1995). Thus, we hypothesize that a further important moderator in the etiology of firesetting relates to self-esteem. Again, we hypothesize that self esteem plays a crucial moderating role in dictating how severely proximal triggers will reflect and interact with psychological vulnerabilities. We hypothesize that, in some circumstances, high self-esteem will represent a protective factor since it will buffer the individual from the most severe effects of triggers on already existing deficits. Poor self-esteem, on the other hand, is likely to exacerbate existing psychological vulnerabilities increasing the likelihood that they will form critical risk factors for firesetting.

4.3.2.6. Firesetting maintenance and desistance. A final crucial area of explanation for the M-TTAF revolves around the explication of (i) how firesetting behavior may become reinforced and consequently repetitive and/or (ii) how individuals who fireset come to desist from their firesetting offending. In terms of basic reinforcement of firesetting, we synthesize key features of both Jackson et al.'s (1987) and Fineman's (1980, 1995) models to hypothesize that reinforcement principles play a critical role in the maintenance of firesetting behavior. To illustrate, positive

consequences of firesetting in the forms of sensory stimulation, positive affect, power and acceptance, financial reward, and instrumental gains are likely to reinforce and increase the likelihood of firesetting re-occurring.

Key to such reinforcement is the experience of positive affect and associated cognition (e.g., satisfaction and pride or relief associated with the sensory stimulation elicited by fire). Such reinforcement principles are able to explain a wide range of repetitive firesetting. For example, an individual who sets fire to critical evidence associated with his/her criminal behavior may well experience significant relief and/or pride from evading the law which will increase the chances of them using fire in the future in similar ways. Alternatively, a firesetter who receives intense visual and affective stimulation from igniting fire is likely to pursue firesetting repeatedly in order to gain sensory reinforcement. Akin with Jackson et al. (1987), we also hypothesize that negative reinforcement principles will also play a key role in repetitive firesetting. Here, we hypothesize that the negative consequences of firesetting (e.g., societal rejection, intense supervision around fire) will further entrench psychological vulnerabilities already driving the underlying firesetting behavior (e.g., poor communication and intimacy with others) thus further increasing a pre-existing preference for firesetting.

Clearly, however, in addition to explaining repetitive firesetting, the M-TTAF should also account for those firesetters who desist from firesetting. Numerous theories (Laub & Sampson, 2003; Laws & Ward, 2011; Maruna, 2001) suggest that the relationship between desistance and both external and internal opportunities for self-identify change is interactional rather than purely unidirectional. Drawing upon these theories, we hypothesize that, for some offenders, cognitive transformations in the form of personal control, internalization of responsibility, problem solving and pro-social attitudes and goals are likely to result from a variety of sources (e.g., rehabilitation or external opportunities). To illustrate, an increase in functional intimate personal relationships, stable employment, and strong social bonds are all important features likely to be associated with crime desistance (Laws & Ward, 2011). Obtaining each of these features is likely to be increased by improved social skills as a product of treatment participation (i.e., formal intervention), socially skilled peers, or external opportunity that promotes such skills via positive reinforcement. Within the M-TTAF, then, we predict that increased feelings of personal control, hope, and strong social ties (factors at both the individual and societal level) will increase the chances of an individual desisting from firesetting behavior.

4.4. Tier 2: A description of the M-TTAFs trajectories

In this section we integrate current research literature, broad theoretical components from other areas of forensic psychology (e.g., Ward & Siegert, 2002), typological classifications, and clinical experience into five prototypical trajectories associated with firesetting in the M-TTAF. As outlined previously, in summarizing these patterns of characteristics leading to firesetting, we aim to increase the utility of the theory for practicing professionals. However, we view the M-TTAF's descriptive trajectories as provisional and anticipate that they will become further advanced as empirical research examining our theory and its trajectories come to fruition.

4.4.1. Antisocial cognition

This trajectory refers to firesetters whose most prominent critical risk factor relates to antisocial cognition, scripts, and values. The content of the cognitions and scripts is hypothesized to be generally criminal rather than holding any particular focus on fire. Thus, in the context of boredom or other criminal goals (e.g., financial gain, or to avoid detection for another crime), fire may be chosen as a convenient means to an end. Individuals who take this trajectory toward firesetting are likely to regard criminal activity as their 'lifestyle', hold numerous antisocial peers, endorse criminal sentiments and values

(Simourd, 1997), and exhibit a host of antisocial and criminal activities and behaviors.

Individuals following this trajectory are unlikely to hold any intense interest in or fascination with fire. However, they may demonstrate other critical risk factors such as problems with self-regulation (e.g., poor impulse control or problem solving). These individuals are likely to have begun their general criminal activity (not necessarily firesetting) at an early age (e.g., childhood or adolescence), and may have received a psychiatric diagnosis of either Conduct Disorder (before the age of 18 years) or Antisocial Personality Disorder (as an adult; American Psychiatric Association, 2000). Such individuals are also likely to have been socialized within an antisocial pro-criminal environment. Research suggests that generally antisocial individuals engage in firesetting as one of a series of criminal behaviors throughout their criminal career (Harris & Rice, 1996; Ritchie & Huff, 1999). As such, this group of firesetters will be least likely to hold numerous firesetting convictions and may be more prevalent in male firesetters (see DSM-IV-TR, 2000). The proximal triggers that promote firesetting behavior are primarily instrumental in nature (e.g., to evade detection for committing another crime; financial gain, or to warn others to stay off 'their patch'). Consequently, these individuals are not hypothesized to hold any inappropriate fire-scripts; although they may hold generally aggressive scripts that facilitate their antisocial behavior. Thus, if antisocial attitudes can be restructured into more pro-social attitudes, and antisocial goals met in a prosocial manner, then firesetting behavior is also likely to diminish by association.

4.4.2. Grievance

This trajectory refers to firesetters whose most prominent critical risk factor relates to problems in the areas of aggression, anger, and hostility (i.e., problems primarily with self-regulation). Firesetters following this trajectory are hypothesized to be characterized by some level of trait aggression, and experience anger and rumination over perceived and real social slights and misdemeanors. In the context of other potential critical risk factors such as communication problems (e.g., poor social skills and assertiveness), and a fire-aggression fusion script (i.e., the development of an aggressive script that links indirect aggression with fire), such individuals use fire to send an authoritative message to those that have wronged them (i.e., proximal triggers in the form of external provocation and internal anger, rumination, and associated cognition). An important by-product for the self is also generated consisting of a temporary increase in self-esteem and self efficacy. Such individuals are likely to have witnessed or been the direct victim of significant aggression during their formative years and may well have exhibited angry or aggressive behavior as an adolescent (e.g., passive aggression).

Research supports the fact that numerous individuals exist whose main motivating factor underlying firesetting is that of revenge or retribution (Inciardi, 1970; Koson & Dvoskin, 1982; Rix, 1994). Such individuals are unlikely to exhibit an intense fascination with or interest in fires for their own sake, but will value fire as a powerful tool with which to effectively deliver revenge and warnings to others either directly or indirectly via displaced aggression. Fire may have been used repeatedly in service of this higher order goal, or on a one-time occasion and is likely to be exhibited by both males and females (see Icove & Estep, 1987; Lewis & Yarnell, 1951). Such individuals may hold some level of antisocial attitudes and attitudes that support the use of fire as a 'warning' (e.g., "It was only supposed to scare them", "I gave them plenty of time to get out in time"). Treatment for these individuals will need to focus upon their clinical features which are likely to include problem solving deficits experienced as a result of anger and associated cognitive appraisals. Work exploring and restructuring the fire-aggressive script will also need to be undertaken in various forms such as: education regarding the effects of fire, improving assertiveness and other forms of communication in the context of anger, and dealing with ruminative thinking styles.

4.4.3. Fire interest

This trajectory refers to firesetters whose most prominent critical risk factor revolves around fire interest (i.e., inappropriate fire interest or scripts) although diagnosis of Pyromania (see *DSM-IV-TR*, 2000) is not necessary. Firesetters following this trajectory are hypothesized to show some elevation of fire interest, fire paraphernalia, and the consequences of fire. Individuals within this trajectory may also have developed a deeply entrenched coping script that involves fire such that, in times of high stress and arousal, fire is used as a type of coping mechanism and viewed as holding key arousal-reducing properties (see *DSM-IV-TR*, 2000). Alternatively, fire may be viewed as holding intensely exhilarating properties. Fire viewed with interest for its own sake may be used by individuals following this trajectory as a pleasurable activity in and of itself (e.g., burning rubbish and furniture inappropriately; setting fire to empty buildings) due to intense sensory or affective stimulation. Self-regulation deficits in the form of impulsivity may also be present.

The etiological underpinnings of such an interest are hypothesized to be produced by a complex interaction of social learning, classical conditioning, and cultural forces. It is likely that firesetters following this trajectory will also hold the critical risk factor of fire-supportive attitudes (e.g., “It’s not harmful to anyone,” “I can control the fires I make”) that support their firesetting activity. However, such individuals are unlikely to hold generally criminal attitudes and values and so are unlikely to hold any notable history of generic offending. Thus, within therapy, it is the lifelong relationship and identity with fire that must be explored—as well as the context triggering firesetting (e.g., boredom, stress)—in order to alleviate the clinical features seen in therapy (i.e., fire interest, and attitudes supporting fire) and associated with repeated firesetting. This trajectory is likely to be prevalent in both males and females. In particular, other avenues of pro-social coping and thrill seeking must be established. Furthermore, attempts may be made, in severe cases to reduce the sensory and psychological stimulation associated with fire via conditioning and satiation procedures.

4.4.4. Emotionally expressive/need for recognition

This trajectory refers to firesetters whose primary critical risk factor revolves around problems in the area of communication (i.e., problems primarily with social skills, assertiveness, intimacy). Firesetters following this trajectory are hypothesized to form two main subtypes: *emotionally expressive* and *need for recognition*. Firesetters following the emotionally expressive trajectory are hypothesized to hold the additional critical risk factor of emotional regulation issues in the form of poor problem solving skills and impulsivity such that, in the context of proximal triggers and contexts that place pressure on coping (e.g., death of a loved one, financial problems, depression), the individual feels unheard, unable to communicate core needs, and hopeless. In such a context, the individual may feel that their only “viable” option available to them is to send a dramatic message to others (either at the individual or the societal level)—via fire—about their current sense of hopelessness or need for support so as to alleviate their current situation. Although this need to send a message resembles that of the grievance trajectory, the purpose of this message is to draw attention to the individual and their emotional needs (e.g., cry for help); whereas, the message underlying the grievance trajectory is to draw attention to a perceived external goal (e.g., revenge). Accompanying these emotionally expressive features may well be some longstanding preference for fire as a powerful societal tool for gaining recognition (i.e., a fire-coping script).

Firesetters within this trajectory may also use fire in order to self-harm or suicide. Such behavior is associated with borderline personality disorder and will be especially prevalent in the female firesetting population (see Coid, 1993; Coid, Kahtan, Gault, & Jarman, 1999; Miller & Fritzson, 2007). Here, fire may be used both as a communication tool—to draw others’ attention to unmet needs—or as a direct avenue for releasing intense negative affect and pain that they feel unable to express in conventional ways. Thus, the main focus within therapy for these individuals should be an increase in skills sufficient to express

emotional needs more immediately via appropriate outlets. Such therapy might include a general focus on social skills, communication of basic needs, assertiveness, and dialectical behavior therapy (Linehan, 1993).

Firesetters following the *need for recognition* aspect of this trajectory also fireset in order to send a dramatic message to others (and thus hold the primary critical risk factor of communication problems), but this message is generally pre-planned such that the firesetter remains undetected (i.e., intact self-regulation) and gains significant social attention and status from having “tackled” the fire or averted others from danger (e.g., “heroic” firesetters). It is hypothesized that such firesetters, akin with emotionally expressive firesetters, are unable to achieve their need for recognition in a pro-social manner (due to a lack of social skills, capabilities, or opportunities) and use intact self-regulation skills toward the inappropriate goal of gaining recognition. There may exist some personality problems (e.g., Narcissism) that facilitate and maintain the firesetter’s need for social recognition. The main focus within therapy for these individuals should be a focus on increasing the individual’s skills and capabilities to establish individual and societal recognition via more socially acceptable avenues. Any pertinent personality issues facilitating the individual’s needs to acquire social recognition in unacceptable ways should also be explored.

4.4.5. Multi-faceted

This trajectory refers to firesetters whose primary critical risk factors revolve around fire interest and offense-supportive attitudes. Other likely critical risk factors are self/emotional regulation skills and communication problems. Thus, this trajectory incorporates individuals who have developed complex and serious problems across an array of factors linked with firesetting behavior. It is predicted that these pervasive deficits will reflect a highly adverse developmental context characterized, for example, by a range of abusive experiences such as parental neglect and lack of stimulation, inappropriate antisocial modeling from caregivers, the presence of highly antisocial peers, and in some cases the acquirement of cognitive functioning deficits (e.g., via insult or birth defects). Such vulnerabilities, coinciding with a natural childhood curiosity toward fire, will heighten the likelihood that early fire play will become reinforced as an important messenger, natural coping mechanism, and sensation-enhancing tool.

Most certainly, such individuals are hypothesized to hold antisocial cognitions, sentiments, and values that support antisocial behavior generally as well as firesetting. Consequently, crime, including firesetting, is part of a pervasive and longstanding pattern of behavior and firesetting behavior is likely to be repetitive with little or no regard for the safety of others (i.e., theory of mind deficits). This trajectory is hypothesized to be present in both female and male firesetters although it may be slightly more prevalent in males; especially those who exhibit Antisocial Personality Disorder (*DSM-IV-TR*, 2000).

Fire interest and associated antisocial cognitions form the underlying backbone of this offender and, consequently, firesetting may be used in the service of various needs. As noted earlier, such firesetters are likely to evidence problems also in the areas of self/emotional regulation (i.e., trait anger and aggression, rumination, poor problem solving, impulsivity) and/or emotional communication. In such cases, due to the individual’s identification with fire, fire becomes a tool called upon in the context of poor emotional control and goals associated with retribution and/or the communication of current emotional needs (e.g., setting fire to one’s house following a relationship breakdown).

The key difference between this trajectory and the fire interest trajectory relates to the existence of fire interest in the service of antisocial goals and cognitions in addition to the other likely critical risk factors of self-regulation and communication issues. Consequently, a whole variety of potential motivators is likely to be associated with this trajectory. It is the combination of general criminality and inappropriate fire

interest that will appear most prominent to the consulting clinician; and that will require intensive treatment in order to alleviate what is likely to be extensive and pervasive firesetting behavior.

5. Appraisal of the M-TTAF

Although preliminary, the M-TTAF represents a comprehensive multi-factorial theory of deliberate adult firesetting and has been developed from unifying the strongest parts of previous theories alongside additional contemporary research findings, and taxonomic knowledge. The M-TTAF combines developmental, biological, psychological, and contextual factors into one overall theory to explain the variety of firesetters and firesetting characteristics presented in clinical practice. In particular, the M-TTAF has built upon and unified Jackson et al.'s (1987) and Fineman's (1980, 1995) theories through stipulating that firesetting and fire interest are the products of powerful social learning experiences as well as associated affect and cognition. A key difference of the M-TTAF, however, is that it attempts to (1) explain a broader variety of firesetting behaviors (e.g., firesetting as part of a generally criminal career, firesetting and self harm), (2) incorporate and acknowledge the concept of firesetting *desistance*, (3) distinguish between distal and proximal variables, and (4) incorporate typological knowledge in the form of exemplar trajectories associated with firesetting (see Ward & Siegert, 2002).

5.1. Key theoretical criteria

In developing the M-TTAF, we have attempted to adhere to the six required features necessary for the development of successful theory as outlined previously. Here, we reiterate each of the required features and explain how we feel each is addressed within the M-TTAF.

The first essential criterion revolves around the provision of *multiple factors* that require explication as cognitive, affective, and behavioral variables within a clear account of how such variables interrelate. The M-TTAF adopts a clear multi-factorial approach to the explanation of firesetting that incorporates biology, cultural, contextual, and psychological factors and explains how the cognitive, affective, and behavioral constituents of these culminate in firesetting via interactive proximal factors and triggers, moderating factors (i.e., mental health), social learning, and conditioning theories.

The second criterion stipulates that the psychological phenomena associated with the presenting client should be described as well as any restrictions regarding scope of offending population detailed by the theory. The M-TTAF describes the psychological clinical features of the presenting client as representing a direct reflection of the four psychological vulnerabilities (i.e., inappropriate fire interest/scripts, offense-supportive attitudes, self-regulation issues, and communication problems) that form the critical risk factors associated with firesetting and outlines the likely pattern of such characteristics via five prototype trajectories. The M-TTAF also provides some explanation of the distal factors likely to be associated with deliberate adult firesetting rather than focusing explanation on child or juvenile firesetting per se. Thus, the M-TTAF focuses on male and female *adult* firesetters and, as such, has been developed primarily from literature relating to these populations.

The third criterion stipulates that the mechanisms and interaction of mechanisms hypothesized to create the psychological phenomenon associated with the presenting client should be clearly outlined. Within the M-TTAF, the psychological features of the client are hypothesized to represent each of the four groups of psychological vulnerabilities that become triggered into critical risk factors via the effects and various interactions of proximal factors and triggers (e.g., external events, internal affect and cognition) and moderating variables (i.e., mental health and self esteem).

The fourth criterion revolves around the description of likely multiple trajectories that may account for the various offender subtypes

described and explored in the research literature. Within the M-TTAF, we have described five hypothesized trajectories that we believe account for, and accommodate the range of offender subtypes proposed in the firesetting literature. We believe that this aspect of the M-TTAF represents significant strengths in relation to its predecessors since the theory is better able to describe (i) firesetting that occurs in the context of other offending behavior, (ii) firesetting as the product of self harm, and (iii) firesetting in the pursuit of social recognition (i.e., 'hero' firesetters). These subtypes have generally not been successfully accommodated in previous theories of firesetting greatly limiting associated scope and practical utility.

The fifth criterion relates to providing an account of both the distal and proximal factors (and interaction of these factors) in the culmination of key psychological phenomenon. In the M-TTAF, distal factors in the form of developmental experiences (an interaction of learning, biological, and cultural factors) are hypothesized to provide an important element, in unison with more proximal factors (e.g., life events, contextual factors and internal factors), in the development of key psychological vulnerabilities. In line with this logic, the M-TTAF is able to explain how some individuals may enter early adulthood with numerous psychological vulnerabilities reflecting their early caregiver environment (e.g., poor attachments, social disadvantage) and associated psychological responses, while others may experience relatively positive caregiver environments and begin developing severe psychological vulnerabilities more proximally, during adulthood, as a result of various manifestations of biological, cultural, and contextual factors. We believe that this aspect of the theory represents a key strength since—unlike previous theories—the theory is able to detail the myriad factors that interact and manifest variously over an individual's life course to facilitate and reinforce firesetting.

Furthermore, unlike previous theories of firesetting, the M-TTAF is able to outline how some individuals, in the context of adverse developmental context, might not come to offend. The key aspect here relates to how the M-TTAF conceptualizes individual psychological consequences and responses to myriad developmental experiences, social learning in relation to fire, and key moderators in the form of mental health and self esteem. Thus, an individual who experiences poor attachment and social disadvantage as a child may respond to this context in various ways according to temperamental factors and protective factors (e.g., pro social peer relations, high IQ) resulting in various psychological manifestations that will not necessarily constitute vulnerabilities associated with criminal behavior and firesetting. Other individuals, however, may well develop vulnerabilities associated with criminal behavior in the absence of firesetting either because fire has never developed into any pervasive cognitive script, or the context in which they commit crime never affords them the opportunity to fireset.

The final criterion stipulates that the developed theory should provide a level of detail commensurate with contemporary research knowledge and literature on the topic. The M-TTAF has been developed from what we believe to be a scarce and underdeveloped research base. One of the most researched areas is that of typologies and associated motivations (see Lambie & Randell, 2011, for review) and it is precisely because of this that we have unified theoretical components from a previously successful theory in forensic psychology (i.e., Ward & Siegert, 2002) in order to strengthen the clinical utility and typological trajectories of the M-TTAF. We are aware that any theory developed within such a largely unspecified and under researched context is likely to lack some explanatory detail. Thus, we invite researchers to begin using the theory as a framework so as to further develop the M-TTAF.

5.2. Relative strength of the M-TTAF

Our appraisals of previous longstanding firesetting theories have centered on the relative strength of each theory according to *empirical*

adequacy, external consistency, unifying power, fertility, and explanatory depth (see Hooker, 1987; Newton-Smith, 2002; Ward et al., 2006). We have attempted to maximize the M-TTAF's strengths on each of these features—particularly in the aspects of unifying power and associated fertility relative to previous theoretical offerings although, of course, there are evident weaknesses. In terms of empirical adequacy, key components of the M-TTAF are supported by current research in firesetting (e.g., communication problems; Rice & Chaplin, 1979; low self esteem; Smith & Short, 1995). However, there are some areas that are admittedly scant (e.g., offense-supportive cognition), and the theory, as a unified whole, is yet to be empirically tested. Consequently, while we believe that the theory is as empirically grounded as possible given the current research knowledge there is clearly room for further empirical support and exploration.

In terms of external consistency, the M-TTAF is consistent with a number of firesetting theories (i.e., Jackson et al., 1987), general criminal behavior (e.g., Huesmann & Eron, 1984; Ward & Siegert, 2002), clinical psychology (i.e., social learning theory, classical conditioning, attachment theory; Bandura, 1977; Bowlby, 1969, 1973; Schachtman & Reilly, 2011), and contemporary social-cognitive psychology (i.e., schema theory; Fiske & Taylor, 2008). Given these resources, we believe that the M-TTAF represents a broad explication and unification of currently accepted firesetter theories within one overall framework (i.e., unifying power). Certainly, the M-TTAF recruits and unites a broader selection of accepted theories rather than limiting to current firesetting theories although the clarity of synthesis may require future analysis as further research and resources within the area become available.

In terms of fertility (both research and clinical) we believe that we have developed a theory that will, in time, generate significant research activity and associated clinical applications. Not only does the M-TTAF provide trajectories that may be tested empirically (e.g., via cluster analysis), but the theory as a whole postulates psychological vulnerabilities and associated critical risk factors that require substantial research evaluation in order to ascertain if these are, indeed, the criminogenic needs associated with various firesetting behaviors. We have arranged key vulnerabilities and associated risk factors according to current research, but we anticipate that our knowledge of these factors will notably increase warranting further M-TTAF developments and amendments.

Finally, the explanatory depth of the M-TTAF is something that we feel is currently commensurate with the level of detail provided within the firesetting literature. In particular, the M-TTAF is able to explain the difference between a firesetter who sets fires as one of many antisocial behaviors and a firesetter who displays a more specific interest in fire and its attendant trappings. Furthermore, the M-TTAF provides a somewhat more detailed account of the relationships between triggers, psychological factors, moderators, and critical risk factors in the culmination of firesetting behavior and the clinical features of deliberate adult firesetters that is surprisingly absent from previous theory.

6. Conclusions

In this paper, we have described development of a new theory of deliberate adult firesetting in the form of the M-TTAF. While the M-TTAF inevitably holds some shortcomings commensurate with existing research knowledge in the field, we believe that this theory represents key advantages over existing theories (e.g., Jackson et al.'s Functional Analysis Theory, 1987; Fineman's Behavioral-Dynamic Theory, 1980, 1995). Key features of the M-TTAF include: (i) organization of current research into hypothesized dynamic risk factors or vulnerabilities associated with the facilitation and maintenance of firesetting behavior; (ii) unification of distal and proximal factors as contributors to firesetting, (iii) identification of key factors associated with repeated firesetting and firesetting desistance, and

(iv) description of key firesetting trajectories (or routes associated with various firesetting behaviors) that account for firesetting within the context of generally antisocial behavior as well as that associated specifically with fire interest. Our intention, in developing the M-TTAF has been to embrace the key strengths of previous pioneering theories of firesetting, and to further build upon this work through unifying these strengths with other critical theoretical components and factors. Of course, there are some weaknesses with the M-TTAF. However, we hope that we have generated a theory that will move the firesetting field forward so as to learn more about the assessment and treatment of what is an intricate, multifaceted, and extremely complex behavior.

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